Laboratory Studies of Strengths and Pressure-broadened Widths of Lines in the 10 μm Band of Ammonia Molecule.

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The proper identification and interpretation of the infrared signatures in the spectroscopic observations of the outer planets by orbiting probes and ground-based astronomers creates a sustained need for laboratory data on individual spectral lines obtained at temperatures and pressures relevant to the respective atmospheres. The analysis of the infrared spectra of Jovian atmosphere in the 10 μm region is influenced by the accuracy of laboratory data on spectral lines of $^{14}NH_3$ and $^{15}NH_3$. We present here recent high-resolution studies of the absolute intensities and collision-broadened widths of lines in the ν_2 bands of ammonia performed in our laboratory. These data were obtained with our coolable cells and a Fourier transform spectrometer. The effects of pressure-broadening by H_2, N_2 and O_2 were investigated at 200, 255 and 296 K. The coefficients of temperature dependence of linewidths were derived for individual transitions in the 10 μm spectral region from these data.